# Michigan Business Review

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# Michigan Business Review

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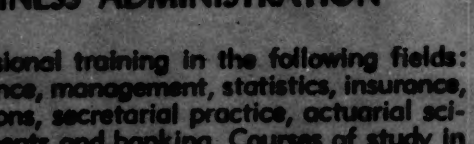

Dean

*Production processes are not perfect, and therefore inspection is necessary — with its costs and problems.*

# Safeguarding Quality Standards

*Eugene C. Yehle*

IT is commonplace for consumers deliberately to spend money on defective products. Indeed, who has not at some time or other purchased a shirt, a pair of shoes, or a piece of carpeting because it was a "second" and therefore sold at a lower than list price! But we made such purchases because the defects, if outwardly discernible at all, presumably did not interfere with a normal use of the product.

The majority of purchases, however, are for "firsts," although this classification is exceedingly broad and is somewhat misleading. A "first" is merely a product which the manufacturer sells at list price because that product was passed by his inspection system. The product presumably meets certain minimum standards that reflect the quality class or price line to which it belongs. But we occasionally find flaws in the "firsts" of almost all manufacturers, and therefore it must be true that their inspection systems are in some measure inadequate. Is there then something fundamentally wrong with the systems in use today? Are the inspectors at fault? Are the inspectors' tools inadequate? Are the inspectors' procedures unscientific? All of these factors are important, but paradoxical though it is, the best interests of both business management and consumers are served when a uniformly small number of defective products are allowed to escape the inspection net.

A person sympathetic to the fallibility of inspectors might ask, "Have we not advanced sufficiently far technologically so that substandard products need never be produced in the first place?" The answer, of course, is "no." The machine marvels of today are operated and indeed built by fallible men. A grinding wheel must be redressed when in the operator's judgment it will no longer grind to the blueprint specification. A lithograph machine must be adjusted when the operator decides that the ink flow is insufficiently uniform.

Human judgment is not the only source of quality deviations. Machines and material themselves are contributing causes. Products cannot be made exactly alike, although we have long heard that the advances in mass production are in large measure due to our ability to manufacture interchangeable parts. Variations in size, weight, roundness, and strength are natural and unavoidable; "interchangeable" means only that the variation which is present is within certain tolerable limits. Thus a particular automatic screw machine may be capable of turning out dimensionally perfect parts for an electric switch box but not for a camera assembly, because less variation is allowable among camera parts than among electric switch parts. (One sometimes wonders if defective units are caused by machines and materials or by the tolerance limits themselves.) If the same machine is

*About the author —*

Eugene C. Yehle, a graduate of this School, is Assistant Professor of Statistics in this University. He has been associated for three years with the summer short course in Quality Control, given for men in industry.

called upon to do both jobs, there may be no alternative but to sort the camera pieces—good from bad—before using them in further operations. And in this sorting stage a few bad parts are almost certain to be overlooked and passed along with the good ones.

In order to control these machine and human errors, and at the same time to bring together the divergent views of management, designers, operators, salesmen, servicemen, and users as to what constitutes satisfactory quality, final auditors of product quality are plainly required. They are important parts of the productive process, although their work is often called "unproductive."

## Inspection Personnel

What sort of requirements does a man need in order to judge the judgments of others? It is perhaps out-of-step with the times, but generally true, to say that he does not need a college degree. In fact, the routine nature of inspection work makes the choice of such a person inadvisable for his own and the company's sake. On the other hand, the job does require a high calibre man in many respects. He has to be alert during long, monotonous hours of looking, tasting, smelling, feeling, or listening. He must have the courage to follow his orders in the face of demands to "move that stuff out of here in a hurry" or charges that "I've been making this stuff for 30 years and do you mean to stand there and tell me what to do?" An inspector may be called upon to read blueprints, to operate complex mechanical testing devices, and to make skilled judgments about flavor or tone quality. Inspection often requires an ability to count and perform simple arithmetic calculations. In short, the job in many cases can hardly be filled by an unskilled worker.

But here is a stumbling block: a skilled worker cannot be paid unskilled wages. Provided that a manufacturer is willing and able to recruit the right kind of inspector, can he afford to pay for what he gets? We rapidly reach the conclusion that he might well hire less than ideal inspectors at the risk of a few —not too many—defective products and dissatisfied customers.[1] Or to put it another way, we might reason that customers are not willing to pay the price which technically perfect products would have to command, and that it is therefore reasonable for producers to market defective items and to plan for the adjustment of customer complaints.

## Inspection Standards

The tomatoes of a certain popular brand carry the following inscription on the can label: "Good red color. Practically free from defects. Normal tomato flavor." These are admirable objectives; but can "good" color, "practically free" from defects, and "normal" flavor be defined objectively? If not, the words are mere eyewash. Even supposing that objective standards are found, it is extremely difficult to adequately train and supervise a battery of inspectors so that they will reach and maintain a uniform standard of judgment. The very fact that the majority of units produced are of satisfactory quality makes the inspector's job hard to carry out. On the one hand, he has the nerve-wracking task of making repeated hair-line decisions, and on the other hand, his senses are numbed with fatigue so that everything looks and tastes alike.

## Setting Tolerances

The difficulties of defining a standard and designing a system for mass inspection of articles are not limited to food products. Inspecting the surface finish of automobile bumpers, dining room tables, and ball bearings is probably no less a challenge, and even where the quality characteristics can be expressed quantitatively as so many inches of diameter, degrees of temperature, ounces of weight, or ohms of resistance there remains a need for standards. First of all a product

[1] We should not assume that even the best inspector will be infallible. Tests on the performance of good inspectors under good working conditions have shown that, on a sorting operation, as many as 20 per cent of the defective units may fail to be discovered. Or put in another way, 100 per cent inspection may be only 80 per cent effective.

engineer must set up realistic tolerances of allowable departures from target dimensions. He must make an educated guess as to how much clearance is needed so that two units like a piston and cylinder will not "freeze" together. He must also judge how loose a fit will permit satisfactory operation. What these extremes are depends upon such things as the type of material to be machined, the frequency of movement of the parts, the temperature changes that will be encountered in normal operation, and the consequences of an operational failure. Then the engineer must modify these calculations in the light of the capabilities of the machines that will be used to make the product. Finally he is likely to hedge his results because past experience tells him that the boys in the shop will take three thousandths of an inch if he gives them two, and that Joe, the inspector, will screw down the micrometer tight enough to get an extra ten thousandth out of it.

## Inspection Equipment

Once the dimensions and tolerances are set and machines are ready to manufacture the product, it takes more than men to carry out the inspection function. Inspecting instruments often as complex as production equipment must be designed and built. A machine in use in automobile engine inspection checks connecting rods for four dimensions simultaneously: for squareness and parallelism of sides, for diameter of the crank-end hole, and for thickness of the crank end. The beverage industry has a machine which can inspect filled soft drink bottles for impurities, at production line speed. It whirls the bottles at a high speed, electronically examines the vortex made by the contents, and automatically kicks out undesirable bottles as they leave the machine.

This recital of complexities is given only to point out that the cost of inspection hardly begins with the inspector's wages. The time and ingenuity of a host of other people are required in order to make his work effective. Their efforts must receive compensation. The value of additional expenditures on standards development, mechanical testers, and inspection supervision must be measured by the results which they achieve. If other production costs are lowered through the reduction of scrap losses or if the consumer is willing to cover the cost of quality improvement such outlays may be justified.

## In-process Inspection

Suppose that the "High Class Automobile Company" has a competent group of inspectors who are equipped with an up-to-the-minute array of testing gadgets and are supervised by the best in managerial talent. Furthermore, suppose that the inspectors and their tools operate infallibly. Will only defect-free automobiles then be delivered? Hardly. As absurd as our assumptions are it would be even more absurd to assume that all welds, all fastenings, all dimensions, and all component parts will be examined for defects. As a matter of fact many things cannot possibly be inspected in detail. The strength of a weld is typically found by pulling the weld apart[1]; the life of a lamp filament is determined by letting it burn out; safety glass strength is tested by dropping an iron ball from a height sufficient to break through the glass sandwich. These tests are destructive and thereby prohibitive except on a small scale by selecting representative samples.

When a substantial amount of inspection must be performed on a test-sample basis, what protection against defects does the customer have? Obviously, his main line of defense is in having the product made right in the first place. When each machine and each worker does the job as planned, we need not worry about undiscovered mistakes. But mistakes do occur and as a second line of defense we need an inspection department which maintains a lookout for weaknesses in the quality

[1] An alternative procedure is to apply a given force and to note whether the weld separates. The trouble here is that good welds, those that do not break, are strained by the testing process. As a result the number of weak welds present after such testing may be even greater than the number that exist before testing.

front and which takes prompt remedial action when a break-through is sighted.

This view of the role of inspection in industry is now widely held by specialists in quality control methods. They realize that some defective products are likely to reach the consumer since it is uneconomical to prevent them initially through better production methods, or later on through foolproof inspection. They picture the inspector as an agent who can find out what the defects are, how often they occur, and where they originate. Equipped with this knowledge the inspector is in a position to know when errors are occurring with normal frequency and when they are occurring with alarming frequency. Through investigation of truly significant shifts in the normal level of defects he can ultimately help to locate sources of poor quality in obsolete machinery, inferior raw materials, inadequate illumination, untrained operators, or even faulty inspection instruments. If his discoveries are followed by remedial action the inspector can make a real contribution to quality improvement.

It is interesting to note here that the principle of classifying the inspector as an agent of production applies to cost control as well as to quality control problems. "Inspectors" have been used successfully, for example, in such diverse situations as the control of clerical errors in making airline space reservations; the control of overages in measuring yard-goods; the control of the time required to charge a steel furnace with scrap; the control of efficiency of inspectors; the choice of alternative methods of production; the appraisal of the success of a new employee; the selection of an optimum billet weight for forgings; and the control of employee absences and injuries.

Most of these situations are seen to bear directly on means of reducing costs and only indirectly on the problem of quality control, yet they all have an element in common: a measurable factor which varies in time or space. Errors, overages, times, and weights are just as capable of statistical interpretation as are diameter, length, strength, and defect measurements. As a matter of fact, their very collection and dissemination may lead to cost savings by voluntary action on the part of employees who are otherwise uninformed as to the magnitude of mistakes, absences, etc., to which they contribute. Just as often, however, positive action is required, and the quantitative measurements are needed to point the way and measure the results.

## Final Inspection

The popular saying that "You can't *inspect* quality into a product, you must *build* it in" implies the need for process inspection—the on-the-spot, trouble-shooting type of job outlined above. This does not deny—at least as yet—a like need for the old-fashioned final or acceptance inspection. A final check on the completed product to see if it "runs" is desirable even though considerable precautions are taken during production. Here again inspectors may resort to spot checking because a complete examination of all the quality attributes on each product unit such as a can of food or a printed book is impossible or impracticable. The number of defective units which slip through this final net is a matter of mutual interest for producer and consumer.

When an inspector passes judgment on a shipment of, say, cream-style canned corn, there is a risk that he will pass off a substandard lot as acceptable because the test sample represented too favorably the quality of the shipment.[1] As consumers we may feel that such an error ought never to happen, but there are several compensating factors. The shipment may be substandard and yet be entirely edible and nourishing though not quite up-to-par in flavor, color, or consistency. Furthermore, the packer himself faces a risk—that of having an acceptable lot classified as substandard. Such a misclassification is

[1] Random samples rarely are perfect miniatures of the shipment. They will sometimes suggest that the shipment is of better quality than it really is, and sometimes suggest that it is worse than it is. Serious mistakes in classification arise in those instances when it seems impossible that a bad quality lot would yield as good-looking a sample as was observed, and vice versa.

troublesome since the shipment may needlessly be downgraded and sold at a price below its real worth. In some cases, as in a machine shop or foundry, a substandard lot may be entirely scrapped or inspected in detail at a considerable cost.

The fact that samples may misrepresent the underlying state of affairs is not new to us. In the game of bridge, for example, each player does not always get his share of honor cards. Variation around the norm of 5 honors is the usual condition—a condition which is requisite for all games. However, an expert can tell us the degree and frequency of variation around each average, and if we are sufficiently astute we can use this knowledge to improve our game. In similar manner, he can predict the chance of mistakenly classifying as acceptable a substandard shipment of merchandise and of classifying as unacceptable an up-to-standard shipment. Reasoning in reverse, it is possible to devise a plan for test sampling which will keep the risks of misclassification at specified minimum values. To eliminate these risks completely, however, is incompatible with the objective of inspection by taking samples. The manufacturer can only weigh the costs of misclassification against the costs of inspection and try to strike a balance between the two.

Each sampling plan has three main requirements:

1. The selection of a random sample from a batch so as to secure representativeness;
2. The specification of a definite number of items to be inspected; and
3. The specification of the number of substandard items which, if found, will cause the batch to be set aside for special treatment—sorting, salvage operations, or downgrading.

The determination of the sample size and the number of allowable defective units, once a job for an expert, has been simplified in recent years through the publication of so-called "sampling tables." With these tables even the inexpert can select inspection plans that will fit any of a wide variety of industrial situations.

It is plain that there are numerous cases in which products with defects will remain undiscovered even under the most ideal quality auditing systems. No expenditure on inspection, however great, can make possible an unconditional guarantee that each customer will receive a perfect product if that inspection must be performed on a sample basis. Mass production of products for world-wide markets requires innumerable compromises of design, materials, productive methods, and of quality standards. When defects are produced they will surely be sold as a part of some products which are classified as "firsts." Skilled inspectors, careful definitions of standards, adequate inspection devices, and scientific sampling methods can only reduce, and hold at a uniformly low level, the sales of this unwanted product.

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# BUSINESS BRIEFS

DEFENSE PURCHASES

Federal Government purchases of goods and services for defense purposes in January and February reached an annual rate of about $24 billion, double that prevailing in the first half of last year.

BUSINESS LOANS

Business loans by banks in leading cities increased $900 million during the first two months of this year. This borrowing is associated with sizable accumulations of business inventories.

*Financial needs, responsibilities to sister institutions, and obligations in public relations are some of the tough problems connected with televising college athletics.*

# Television and College Athletics

*Herbert O. Crisler*

TELEVISION may well prove to be one of the most significant changes in our social and cultural lives since the introduction of the telephone, the automobile, motion pictures, and the radio into our daily pattern of living. Most adults have witnessed the absorption of these scientific advances into the full scheme of our daily and economic lives. These advances, while rapid, did not, however, come over night.

Now we have a hitherto "sleeping giant"—television—in our midst, who is just awakening from his slumbers. This giant, not even fully aroused as yet, already has made swift and tremendous changes in our ways of living. These changes are proceeding so rapidly that no individual or organization can possibly keep apace.

College athletics is one field feeling many of these impacts. Whether these changes are to be beneficial or detrimental is one of the major headaches that today plague administrators of college athletics all over the country. It is their duty to measure the pressures and determine the effects of this "sleeping giant" on the lives of the young men and women who participate in, or are benefited by, college athletic programs.

In the report of the television committee of the National Collegiate Athletic Association which met in January of this year at Dallas, Texas, the aims of the gathered administrators were set forth as follows:

"We meet here more like a Board of Trustees to study and evaluate the effect of a magnificent new scientific development on our work and responsibilities. Individually and collectively we direct the destinies and control the fate of athletics and physical training of our young men and women in an early formative period of their lives.

"These activities will go forward for greater benefit or retreat in accordance with our collective wisdom and energy. Therefore, we sincerely recommend that you devote serious thought and study to the subject of television, for whether or not it has affected you as yet, it is a certainty that it will."

Almost a year before the Dallas meeting, the Commissioner of the Western Conference invited athletic representatives of several universities, both inside and outside of the conference, to attend a meeting in Chicago to discuss the matter of television in relation to college football.

At that time television set concentration was restricted to four areas, namely Los Angeles, Chicago, Detroit, and the Atlantic Seaboard from Richmond, Va., north to Boston.

## The Key Questions

Four main subdivisions were outlined as a basis for exchange of views on the general question of television.

The questions were:

(1) Is television likely to affect attendance

*About the author –*

H. O. ("Fritz") Crisler, formerly Michigan football coach, is Professor of Physical Education and Director of Physical Education and Athletics. He is chairman of the Television Committee of the Western Conference; and chairman of the Football Rules Committee of the National Collegiate Athletic Association.

at athletic events, particularly college football?

(2) Does a university have any responsibility to its sister institutions?

(3) Could our universities expect any help in sharing the risk in loss of revenue through decreased attendance?

(4) What is the extent of obligation of universities in public relations?

Under the first premise evidence was submitted to indicate that football attendance had been reduced 23 per cent by live television along the Atlantic Seaboard. The Los Angeles area reported a 19 per cent decline. At that time television had grown from a mere 700 sets in 1940 to more than a million sets during the 1949 football season.

As of January 1, 1951, there were in this country an estimated 9,200,000 television sets, and 107 stations servicing 63 markets. By the same date in 1952, barring war curtailment, there will be about 14,000,000 sets in use. By 1955, leading authorities say there will be 30,000,000 sets in use and a possible 1,200 stations.

When it is considered that there now are some 81,000,000 radio sets, exclusive of the phenomenal growth of the television industry, it is not difficult to see why college athletic administrators are concerned over possible inroads of the industry on college football—the main source of income for practically all college athletic and physical education programs.

## Television and Attendance

Figures collected by the National Opinion Research Center at the University of Chicago show some interesting trends during the 1950 season. Tabulation was made on 112 major and 102 minor colleges.

Attendance in major conferences for 1950 dropped all the way from 1 per cent down to 25 per cent below 1947–48 averages. Of the several conferences, the Ivy League suffered the worst blow to its attendance with a 25 per cent drop. Mountain Conference attendance declined 15 per cent.

On the Pacific Coast the two major schools telecasting in the Los Angeles area, UCLA and Southern California were jolted at the box office with 31 and 27 per cent losses, respectively.

It is interesting to note that the Western Conference, with television barred, showed a slight increase in attendance as a whole and the Southwestern Conference which televised only games which had been sold out showed a 39 per cent increase.

There has been considerable evidence that smaller colleges and also high school attendance was reduced by telecast of major games in their areas. One high school reported that its average annual football profit amounted to $3,000 before television. In competition with television it had a $5,000 deficit which had to be made up by the school board.

Before live television was banned by the Western Conference and later by the NCAA both groups received numerous appeals from smaller institutions that consideration be given to the discontinuance of live television.

Television in the Western Conference during 1949, however, did not apparently either reduce or increase attendance since only three institutions were located in areas of substantial set potentials. Illinois and Northwestern, both in the Chicago area, and Michigan in the Detroit area, were the three universities televising.

However, what might have happened with live television in 1950, could well have been another matter. Extension of the coaxial cable, more new stations, micro-wave relays and the tremendous increase in the number of sets, would certainly have caused an over-lap in high set potential and could well have affected attendance.

## Impact of Television on Other Sports

Some of the reasons for this concern over attendance and gate receipts which finance college athletic programs can easily be shown by a look at other sporting and entertainment events.

The Jordan report on professional baseball

both in the major and minor leagues presents some rather startling and significant facts. In 1950 major league attendance dropped 13.7 per cent and the minors dropper 19 per cent, a loss representing 8,000,000 customers.

Three minor leagues and 13 teams have folded. Minor leagues are very seriously concerned over the effect of major league radio and television competition which has definitely curtailed revenue. The franchise of Newark has been shifted to Ottawa, Canada; and the Jersey City team has moved to Springfield, Mass., because of radio and television competition with Yankee, Giant, and Dodger aircasts.

Pacific Coast, International League, and American Association attendance last year all decreased by more than 500,000 each. There is strong feeling among baseball men that when coaxial cables make the telecasting of major league games available in any community, it will be impossible for the minor leagues to continue at all unless some effective method of controlling the major league telecasts is permitted.

One instance in professional football is the case of the Los Angeles Rams. In 1949 six home games not televised drew 309,327 spectators. Six home games in 1950, all televised, drew 158,045 persons, an attendance loss of almost 50 per cent.

The owners of the Rams, however, were protected by a contract providing a television guarantee which supposedly cost the sponsors $280,000. The Rams were the only pro team to conduct live television in their area.

Professional boxing also has felt the impact of the new medium. The Louis-Charles heavyweight fight was viewed by an estimated 25,000,000 video fans. The actual attendance at the bout was 22,000. The gate was $205,370 as compared to $262,000 for a featherweight title bout that was not televised.

Surveys conducted show that television owners went to the movies in New York 20 to 30 per cent less often than previously. Tabulation of amusement tax receipts from Chicago theaters showed a 23 per cent drop during a similar period. Out of 19,000 movie houses in the United States, 680 closed their doors the first six months of 1950.

Meanwhile in Canada, which has practically no television, receipts rose and 562 new houses opened in the same period.

These are some of the facts that administrators of collegiate athletics have before them as they try to solve the problem of television. They would be blind or remiss in their duties if they did not observe and draw upon the experiences in other fields of sport.

### The Financial Importance of Football

But again the problems of the colleges are different. Naturally they must be interested in gate receipts, because these receipts are the only medium by which they can pay for the conducting of athletic and physical training programs so essential to the eduaction of our youth.

Schools have been criticized for adopting a so-called commercial attitude, particularly in football. Critics sometimes lose sight of the fact that when they purchase a football ticket, they are contributing substantial support to the running of all other sports and physical education programs on the campus.

An NCAA questionnaire asked various schools to what degree football receipts contributed to the general athletic budget. While not all schools answered the question, a fair sampling was obtained.

Answers ranged upward from 11 per cent with the general average at 72 per cent. Is it any wonder then why colleges are studying the televising of their sports, especially football, so carefully?

At the University of Michigan, for example, here is a break-down on how a purchaser's football ticket costing $3.60 is divided and spent:

| | |
|---|---|
| Visiting Team | $1.50 |
| Sports Budget (all) | .82 |
| Federal Tax | .60 |
| Maintenance | .45 |
| Administration | .23 |

From the above it is not difficult to see what decreased attendance can mean to the athletic plants of colleges and universities such as Michigan, which receive no legislative appropriations of tax-payers' money to make up deficits.

There is another side of the picture which cannot be emphasized too strongly. As the NCAA television committee pointed out in its report, colleges are morally bound to protect the great and essential role that athletics and physical training must continue to play in the lives of our Youth. This is no time to reduce any program that places emphasis on the physical fitness and moral training of young Americans.

### Responsibility to Sister Institutions

Earlier the question was asked: "Does a university have any responsibility to its sister institutions?"

Let us examine the views of the NCAA committee on this point. The report states: "Your committee feels that television does have an adverse effect on college football attendance and unless brought under some control threatens to seriously harm the nation's overall athletic and physical system.

"True, a few schools may profit and grow into greater powers, but the rank and file schools will be reduced and the widespread play of football and other sports will be greatly diminished due to decreased budgets . . . this will happen if we continue to have a few schools telecast and the remainder scramble around for the crumbs that are left. Under the present system of advertiser's sponsoring of TV games, it is not possible for television to pay the cost of making up to the schools the necessary money to maintain their programs.

"They will say, 'Why should we? We can always buy six or seven schools' TV rights, and that is all we need to make money for us and those six or seven schools'."

Thus it would appear that for the greater good of all institutions, large or small, and including high schools, these problems must be solved on a nation-wide basis rather than in piece-meal fashion.

It is interesting to note also that while schools like Michigan, Army, Notre Dame and a few others have been offered substantial contracts in the past, the Western Conference as a whole has been offered nothing that would lessen the risk of loss to its members.

Speaking of the risk, one conference institution declared a year ago that each of its home games must be a sell-out of 48,000 and this equivalent must be maintained away-from-home in order to meet its budget.

At Michigan the athletic budget has increased by well over 200 per cent because of inflation the past few years. Yet in that period the price of football tickets, our principal source of income, has increased only 20 per cent.

### The Risk of Loss of Revenue

That brings us to a third question: "Could our universities expect help in sharing the risk of loss of revenue through decreased attandance?"

If gate receipts fell substantially below the average before the advent of television, would set manufacturers make up the loss? Would taxpayers be willing to submit to additional levies to make good the deficit? Could television networks or stations be expected to contribute funds? Would state legislatures appropriate funds to maintain a full program of athletics and physical education?

So far there is no real indication that any of these sources would support such a program. College football's only hope of offsetting reduced revenues would seem to be the advertiser. But to risk any substantial sums the sponsor would require network coverage, and technical facilities still are so limited that all institutions could not participate in such coverage.

Cost of a full TV network schedule of home games would mean upward of $750,000 of the sponsor's money. The amount the institution would receive after deducting line charges, talent, network and agency fees, plus station

time would be roughly $120,000. Divided with opponents that would mean $60,000 for the home team.

There also is a reasonable question that the large costs of television production might make it prohibitive for advertising sponsorship to pay for top quality programs. The FCC reports indicate that television networks lost $24,000,000 in 1949. Even the present four billion dollar national advertising budget might have to be expanded to cover a national system of television.

The other possibility might be to televise through a local station which naturally would cover a considerable portion of the expected ticket sales area. Highest amount received in the Western Conference in 1948 through local sources was $2,000 per game. This amount was raised to $5,000 per home contest a year later.

### "Pay-As-You-See" Plans

Under consideration and still in the experimental stages are two systems of television sets that would permit a "pay-as-you-see" plan for quality programs.

One is called Phonevision and is being currently tested in Chicago. It requires a subscriber to call the telephone company if he desires to see a special program, and part of the television signal is channeled through the telephone wire to "unscramble" a blurred picture otherwise seen on the television screen.

The plan might be, for example, to charge $1.00 for each first run movie in Chicago. Fifty cents would go to the producer and the remaining half dollar would be split between the television and telephone companies.

There also is the Skiatron system which consists of equipping the television set with a decoding box into which a plastic coded card will fit to allow the "unscrambling" of the picture. A new card can be purchased at various agencies for certain stated intervals of time or for a specific event.

The NCAA committee is on record as favoring encouragement by the colleges and in cooperating with the television industry to develop some means of paying for athletic events. It is the committee's contention that by working together rather than at cross purposes a satisfactory solution can be found.

It is the belief of many college athletic administrative people that the American public may be willing to pay to see their televised sports events, especially when they realize the money goes to support and augment the athletic and physical education programs so essential to their sons and daughters.

Naturally a major adjustment would be necessary to administer such a system. In all probability both national and local programming boards would have to be selected to work with television networks and stations.

Another method has been post-game telecast of films of Saturday's games during the following week. Most institutions reported these telecasts were well received. In post-game television showing of the films can be controlled so as not to conflict with small college or high school games.

### University Obligations in Public Relations

Now for our final topic: "What is the extent of obligations of universities in public relations?"

There was some adverse criticism and unfavorable reaction from the public when the Western Conference after much careful thought and deliberation decided not to permit simultaneous telecasts of its football games.

The action was taken by the Athletic Directors of all ten conference institutions and later ratified by the Faculty Representatives. This action will be in force once more in 1951 while further experimentation goes on. The National Collegiate Athletic Association has adopted a similar policy this year.

Collegiate athletic officials all feel that there is a definite responsibility toward the public in the field of television, especially to shut-ins. All conference institutions generally agree also that there exists an obligation to those who for some reason or another are un-

able to attend a specific game or games.

Post-game television has aided in the solution of this problem. About the only difference between viewing a post-game telecast and a simultaneous telecast is that the outcome of the game and the size of the score is known in advance.

College authorities still feel, after more than a year's painstaking study and research, that neither the universities nor the television industry are ready to take the big step in returning to live telecasting of college football games.

Once that step is taken there can scarcely be any turning back, and practically all the evidence to date is proof that the risk is still too great. No matter what plans or suggestions have been made regarding live telecasting of games, no one thus far has come up with answers to the two questions that are paramount in the minds of college athletic administrators.

The college officials ask:

If live television is adopted and we meet disaster in attendance, who will make up the loss? If the loss is not restored, what part of our program should be sacrificed? Those are the questions—can you answer them?

## BUSINESS BRIEFS

### INDUSTRIAL TRAINING FOR INDUSTRIAL MOBILIZATION

Where can we get the manpower to produce the materials so urgently needed for the mobilization program? How shall we train the men and women on the "home front" to produce the equipment and supplies needed? To help find the answers to these questions the current issue of BUSINESS INFORMATION SOURCES is devoted to *sources of information* on Industrial Training for Industrial Mobilization. References are to books, magazine articles, and special reports arranged under topics related to training today. They concern: the situation today as compared with 1940, sources of additional manpower, essentials of emergency training, training methods, conference training, role-playing, apprentice training, audio-visual aids, training check lists, know-how developed in World War II, tested training aids now available through various agencies, induction of the new employee, and morale builders.

Copies of this publication are available for a mailing and handling charge of 10c and may be obtained by writing to Miss Rose L. Vormelker, Head, Business Information Bureau, Cleveland Public Library, 325 Superior Avenue, Cleveland 14, Ohio.

### TREASURY RULING ON TAX REFUNDS

According to a recent Treasury ruling, tax refunds, state or federal, arising out of renegotiation of war contracts, are income in the year received.

Under a previous ruling, refunds generally had been treated as income when received, unless excepted by special provisions in the law. Refunds arising from renegotiation, however, had been excepted. These, the earlier ruling held, should be carried back to the year against which the renegotiation applied and tax liabilities for that year recomputed. But the courts in several instances held the exception incorrect and the Treasury has now accepted their findings.

### OIL DEMAND

Oil demand in the U. S. this year will probably range between 6,900,000 and 7,100,000 barrels daily, an increase of 6½ per cent to 9½ per cent over 1950. This prediction was made by H. S. M. Burns, president of Shell Oil Co. Looking further ahead, he forecast domestic demand of eight million barrels a day by 1955 and nine million to 9,500,000 barrels daily by 1960 "provided reasonably prosperous conditions prevail."

*Technology, managerial efficiency, and favorable attitudes will assist economic progress in many countries more than increasing their capital equipment.*

# Technology vs. Investment in Foreign Economic Development

*D. M. Phelps*

THE title selected for this short paper may appear to be contradictory. We are accustomed to thinking of the export of technology as one of the principal features of foreign investment. The fact that capital and technology are usually combined in direct investments is considered one of their chief advantages over portfolio investments, both to the foreign investors themselves and to the countries in which the investments are made. With this conclusion I am in substantial agreement. In direct investments the two are almost inseparable if the investments are to be "operated" rather than simply "held" for appreciation in value. Still it is useful for purposes of analysis to think of the export of technology and of capital as separate movements and even in opposition one to the other.

One reason for so doing is that they have been too closely connected in the minds of those people in the other American Republics whose hopes for more immediate and extensive economic development were aroused by the Point Four pronouncement in President Truman's inaugural address of January 20, 1949. The President called for a "bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas." In reality, however, it is not a "bold, new program" as first announced, but rather an extension or accentuation of a program which has been in operation with the other American Republics in the fields of public health, agriculture, industrial development, and others, for many years. If the announcement had said that we porposed to accentuate and extend the program to other parts of the world there would have been little misunderstanding.

At least in part because of the manner of its announcement, the Point Four program was misunderstood by many people, both at home and abroad. Unfortunately, to them Point Four meant immediate and large-scale financial aid, somewhat on the order of the Marshall Plan. Actually, however, the two programs are essentially different in concept and objectives. Therefore, one of the first problems of the Department of State, and a most difficult one, was to dissociate the export of technology and that of foreign investment, as much as possible, in the thinking of other peoples; and to indicate that the export of technology may require very little concurrent capital investment abroad. Another fact also should have been emphasized, namely, that

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***About the author –***

**Dr. Phelps is Professor of Marketing in this University, and a specialist in the subject of international economic relations. He was first chief of the Division of Foreign Economic Development, U. S. Department of State. This article is adapted from a paper presented by him at the University of Florida Conference on the Caribbean at Mid-Century, December 8, 1950.**

scientific management is greatly needed in underdeveloped countries, perhaps even more than technology.

## Science, Technology, and Scientific Management

People often confuse pure science, technology, and scientific management. They do not see the distinction between pure science and applied science. The aim of science is to discover new knowledge, new principles. In contrast, the aim of technology is to invent new devices, to develop new processes and techniques. New developments in technology are based upon additional knowledge uncovered by research scientists. We as a people, have not been particularly successful in scientific discoveries. For instance, the basic discoveries of radar and atomic energy were made in Britain and Germany. But we have been effective in making practical use of basic principles, often discovered by others. Over a fifty-year span only 20 Nobel prizes in physics, chemistry, and medicine were awarded to United States citizens, while 119 were awarded to Europeans—36 to Germans alone. However, in the field of technology, as such, we have been very effective and it is this knowledge which is most needed in underdeveloped countries.

These countries likewise need to understand and apply the principles of scientific management which may roughly be defined as social science applied to economic ends. Business men in the other American Republics need more understanding of "how to do things most easily," and this involves both technology and scientific management. It is not a question of working harder, which was always the answer of the old horse "Major" in George Orwell's satire on socialism, *Animal Farm,* but one of how to get economic tasks done more easily and with less labor.

It has been the traditional policy of the United States to place no barriers against the export of these two most important "commodities"—technology and scientific management. The significance of this policy has neither been sufficiently understood nor adequately stressed.

Such a policy has not been followed at all times, by all nations. The British, for instance, after the American Revolution, attempted, by every possible means, to withhold the exportation of the technology of the textile industry from England to the colonies. Laws were passed prohibiting the exportation of any plans or drawings of the machinery used in manufacturing; and efforts were made to prevent the emigration of factory workers or others who had knowledge of the construction of textile machinery.

The United States, however, follows a policy of not withholding either technical knowledge or specialized equipment from other countries, except for reasons of security. It might be noted in passing that our policy of furnishing technology to the U.S.S.R. during World War II, in the light of the present situation, appears to have been most unwise. Yet I am not one of those people who believe that our present difficulties with the U.S.S.R. could easily have been foreseen. At least there appears to be no valid reason at present for withholding technology from the other American Republics, other than in a few cases involving security. The history of international trade has amply proven that, from an economic point of view, an industrialized nation has nothing to fear from industrialization and other economic development abroad. While the pattern of exports and imports will change, the history of foreign trade has amply proven that the volume of trade increases rather than decreases under such conditions, and that a higher level of living in both countries eventuates.

## Need for Technology and Scientific Management Abroad

In order to indicate the need both for technology and scientific management in other American Republics, consider the following particular case history. During my sojourn in Venezuela, during the early part of World War II, the Pan-American building in Cara-

cas, used by the American Embassy, was enlarged from two to four stories. The concrete was mixed outside my office on the first floor, and was carried in the familiar used five-gallon oil cans to the upper stories by a large group of workers. Up and down they went, day after day, with cans of cement on their shoulders. This manner of handling materials is probably little different from the way in which they were handled to build the pyramids. Witnessing such crude methods makes a person trained in management positively uncomfortable. A lift could have been installed without much difficulty to take the concrete to the upper stories at a substantial saving in manpower and, very probably, in cost likewise. If leaders in economically underdeveloped countries, and, in particular, the owners of small industrial establishments, people in the construction industry, and those who are engaged in the marketing of goods would take to heart the lesson of the Gilbreth story in the movie "Cheaper by the Dozen," economic development throughout the world would be substantial without any influx of foreign capital.

## Better Use of Productive Factors Needed

The essential problem of economic development is to make *better* use, *continually*, of the various productive factors, that is, of economic resources. Of course, the supply of some factors—for instance, capital—may need to be supplemented from abroad if there is a relative scarcity of it and this scarcity is withholding development. Apparently, however, the fact that productive factors are in part substitutional is not sufficiently recognized. Capital goods are labor saving devices. Obviously, the need for such devices depends, in most instances, upon the need for saving labor. It made good economic sense during the late war to build some of our airports abroad by mass labor, and others by the combined use of complicated earth-moving equipment and a minimum of labor. Labor was abundant and cheap in certain areas; scarce and costly in others. In peace time the financial test of what is cheapest applies even more strongly. The justification of the importation of capital goods, therefore, depends largely upon the abundance of labor.

At times, admittedly, the financial test applied to the use of means for economic development must be set aside. Urgency of need may suggest that slower hand labor methods should not be used on certain projects, even though labor is abundant. Some military and sanitary projects may be of this character. In this connection, I am reminded of the loan by the International Bank for Reconstruction and Development to India for the eradication of kans grass. This deep-rooted grass is known to infest 10,000,000 acres in India of otherwise good agricultural land. Evidently, deep plowing with heavy tractors, plows, and ancillary equipment is the only practicable method for its eradication. India expects to reclaim 3,000,000 acres by this means over the next seven years. In this instance, hand labor, though abundant, was no match for capital equipment. Thus, equipment was provided through a loan to do the job. Nevertheless, often, only simple equipment such as wheelbarrows, small conveyors, and hand tools, rather than the huge equipment of Caterpillar and LeTourneau, can economically be justified on projects in underdeveloped countries.

It is not sufficiently recognized in underdeveloped countries that the flow of capital to them depends just as much upon their capacity and willingness to receive it as upon the capacity and willingness of other countries to make it available. Since the end of World War II there have been requests from many nations for assistance in economic development, but *very few well-thought-out programs*. The concept of the ability to receive capital implies the ability to use it productively. Raw materials for a project may be lacking, of poor quality, or inaccessible. The demands of the market may be too small to permit economic production if the optimum size of the production unit is large. There may be neither the necessary technology nor man-

agerial ability available. If conditions are not such as to indicate the likelihood of successful operations and still the project goes ahead, productive factors will not be used wisely. *Economic development is not achieved through non-economic projects.*

## Economic Development—A Process of Slow Growth

Economic development is a process of slow growth. There must be a certain balance in that growth, a certain harmony in its various parts if it does not produce a distorted economic structure. Projects which are too far ahead of development in other fields cannot be justified. The construction of roads which lead nowhere in particular in an economic sense, and the development of power far in excess of what can currently be used indicate incapacity to receive capital for these purposes. In contrast, a key piece of road between two expanding regions, or a substantial increase in the kilowatt-hour capacity of an electric power installation where there is a pronounced power shortage indicate capacity to receive capital. ***But the capacity to receive capital is much smaller than most people think.*** In this connection the International Bank stated that the most striking lesson which it had learned in the course of its operations was how limited is the capacity of the underdeveloped countries to absorb capital quickly for really productive purposes.

While these concepts of growth and balance in economic facilities are not difficult to comprehend, they are difficult to apply in actual situations. Judgments must be made on the probable rate and direction of economic expansion. Yet there is usually altogether too little reliable information on which to base such judgments. The situation is further complicated by the fact that some economic units are not divisible in the sense that they can easily be adapted in size to the needs of a region. Then, also, the costs of building economic facilities per unit of output are usually less as their size increases. Thus, there is strong motivation for too great anticipation of needs, for building productive capacity much in excess of present demand. Nevertheless, when this is done the rate of economic development may be retarded rather than advanced, for productive factors may have been used unwisely.

## Factors Which Retard Economic Development

Recently we have become increasingly aware of the importance of proper attitudes toward economic activity. Those of us who are familiar with the economies of the other American nations feel that there often has been a lack of willingness on the part of citizens to commit their capital to economic projects; likewise, a lack of venturesomeness in economic affairs, of self-reliance, and of realistic planning for the future. In part, these attitudes are an outgrowth of the fact that in Latin-American countries the businessman and the technical expert are not accorded so high a social status as the lawyer, the large landowner, the physician, and the diplomat. Business has not drawn the most able people into its ranks, nor even its fair share. Industrial technology and business management are both highly respected in the United States, but they are not considered as high level professions in the other American Republics. Moreover, in the past two decades there has been an increasingly unfavorable attitude in these countries toward direct foreign investments. Finally, an improper attitude toward government which is an underlying cause of political instability is often present and retards economic development in many countries. These attitudes must change if economic development is to proceed vigorously and along sound lines in the future.

The principal thesis of this short paper may now be summarized. It is that technology, managerial proficiency, and favorable attitudes are particularly needed for economic development in the other American Republics and, in general, are needed more than a large volume of additional capital. Let me hasten to add that variations among the Republics

on these matters, as on others, are very great indeed, and thus that generalizations are risky.

Excellent work is being done to overcome deficiencies in these factors in a number of countries. Basically, of course, *it is a problem of education,* and should be attacked as such. Those in charge of economic activities should be better prepared for their jobs. There is no lack of basic industrial aptitudes in the other American Republics but there is a dearth of really effective management.

### How Technology and Scientific Management May Be Secured

The question arises of how these factors, which are so greatly needed for economic development, can best be secured. The problem is one which must be attacked on many fronts simultaneously. Both informal and formal education have an important place in the process. As informal education I would include the increase in understanding and proficiency secured as the usual result of foreign investment in productive facilities. In my opinion, this is the best, the most natural "vehicle" for taking technology and managerial proficiency abroad. In the field of industrial development particularly, there is no good substitute for the knowledge and experience of private business enterprise. Nevertheless, this method is not being used as extensively as formerly. The amount of direct investment abroad by North American concerns since World War II, other than in the petroleum industry, has not been great. Efforts both by government entities and by private groups to stimulate direct investment continue, but they have not been successful. There is too much uncertainty involved. Private capital can adjust itself to many conditions, but not to extreme uncertainty. Receptivity of other nations toward investments within their borders has been at low ebb, and the barriers created to investment are formidable. Many informed people in the United States feel that discouragement of direct foreign investment is shortsighted policy, and, principally, because it withholds the importation of technology and managerial proficiency, and, therefore, economic development.

Certain countries, notably Chile, have seen fit to go direct to the market for the employment of technical and managerial skills. At one time Corporación de Fomento de la Producción de Chile (Chilean Development Corporation) was employing 160 United States technicians and management experts in a number of fields as full time consultants. At times the Export-Import Bank and the International Bank for Reconstruction and Development have made the use of technical consultants a condition precedent to the granting of loans for certain projects. By this means considerable technical knowledge has been exported to other countries. Government experts in the fields of public health, agriculture, education, and public administration, to name only a few, have been made available. Cooperation in the fields of public health and agriculture has been outstanding in its results.

The most recently announced and the most widely publicized plan for cooperation is the Point Four program. In principle, the program is sound and fully capable of justification but its administration may be faulty. The problems involved are difficult ones and there are many opportunities for unwise decisions and for "busy work" which has no practical application. However, the experience, both fortunate and unfortunate, with the projects of the Office of the Coordinator of Inter-American Affairs, the Interdepartmental Committee on Scientific and Cultural Cooperation, and the Institute of Inter-American Affairs should be helpful. These projects featured technical cooperation and assistance. It must be reiterated that the Point Four program is of the same general character as the programs of these other organizations and not a program of foreign investment.

The principal problem involved is the one of finding suitable personnel for assignments abroad. In this connection, Willard Thorp, Assistant Secretary of State for Economic Affairs, made the following statement:

"It is difficult to know how many such

people can be found, but this factor more than any other has been responsible for determining the size of the request made by the administration to the American Congress. Actually, the estimates underlying the request provide for 2,445 experts, of whom 1,921 are estimated to come from the United States. This may seem like a relatively small number of individuals, particularly if one thinks of the many countries involved and the many fields of knowledge. However, if one thinks of it in terms of locating the individuals, fitting them into the projects, and actually getting them to work, it is obviously a tremendous undertaking."[1]

To any one familiar with the problems of recruitment, selection, and training for these assignments, and also acquainted with the problems involved in creating conditions in other countries in which those assigned can work effectively, even a modest Point Four program appears to be a formidable undertaking. While our country is actively rearming to meet the threat of communism, the difficulties of carrying forward the program are greatly accentuated. It is unlikely that many technologists or management experts can be spared for work abroad in the months ahead, unless their work contributes to the common defense. Nor will putting the program under the aegis of the United Nations lessen the difficulties or make the administration of the program easier. It may relieve us of charges of officiousness and economic meddling which may at times have been deserved. Nevertheless, if the program is pushed as vigorously as world conditions permit, and if it is kept within the proper channels and well-administered, it holds much hope for the future.

[1] Thorp, Willard L., "Practical Problems of Point Four," *The Annals of the American Academy of Political and Social Science*, July 1950, p. 98.

### Facilities for Technical and Business Education Needed

Finally, there is no good substitute for formal education in technology and management. Technical schools, trade schools, agricultural colleges, and schools of business administration are greatly needed in the other American Republics and those now in operation need strengthening. If it is recognized that economic development is, in large measure, a product of education, assistance in providing buildings, staff, and libraries may be forthcoming. Training, such as that given in the Inter-American Institute of Agricultural Sciences at Turrialba, Costa Rica, and through the agricultural program of the Rockefeller Foundation in Mexico, will do more in the long run to sitmulate sound economic growth than any other type of effort. While the need is not so apparent, formal training is also needed in the technology and management of industry, and must soon be provided if the levels of living are to be substantially improved in the other American Republics.

## *BUSINESS BRIEFS*

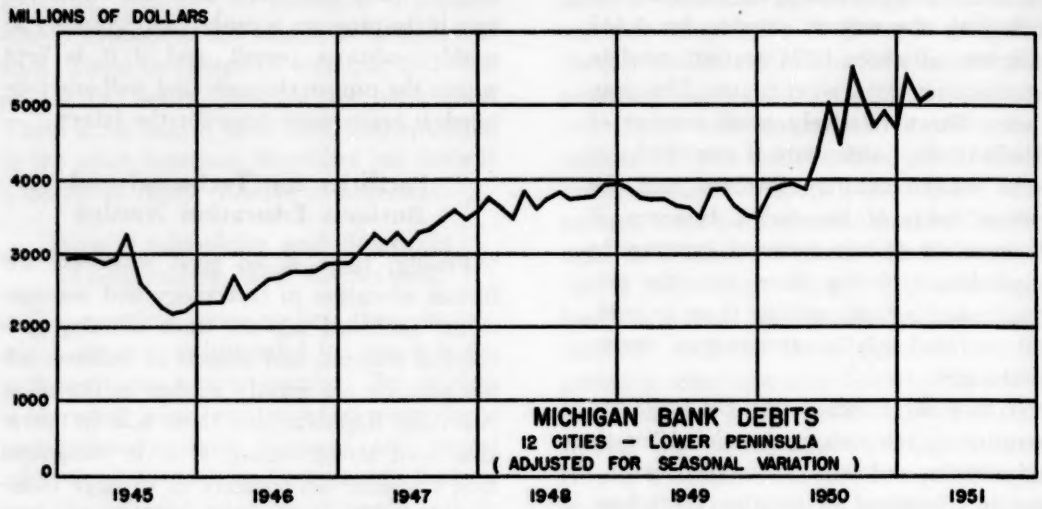
CONTROLLING EXPORTS

The Commerce Department issued a 30-page quarterly report on export controls to show what quantities of various commodities it licensed for shipment abroad during the fourth quarter of 1950. This report is available for 15 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

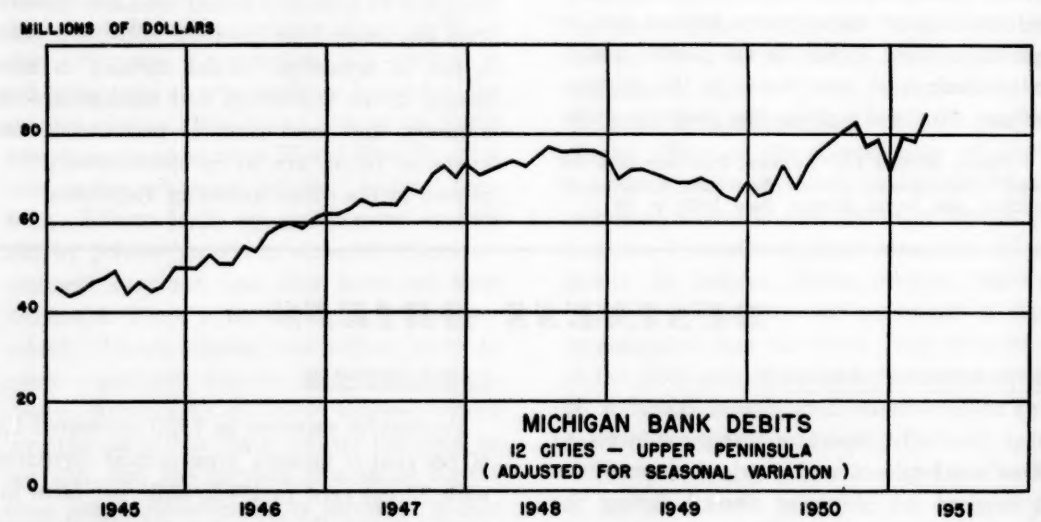
FARM INCOME

Production expenses in 1950 accounted for 60 per cent of farmers' gross income compared with 52 per cent in 1945, while net farm income between the two years actually dropped by one-third in terms of purchasing power. This was reported in a study made for the Senate Agriculture Committee.

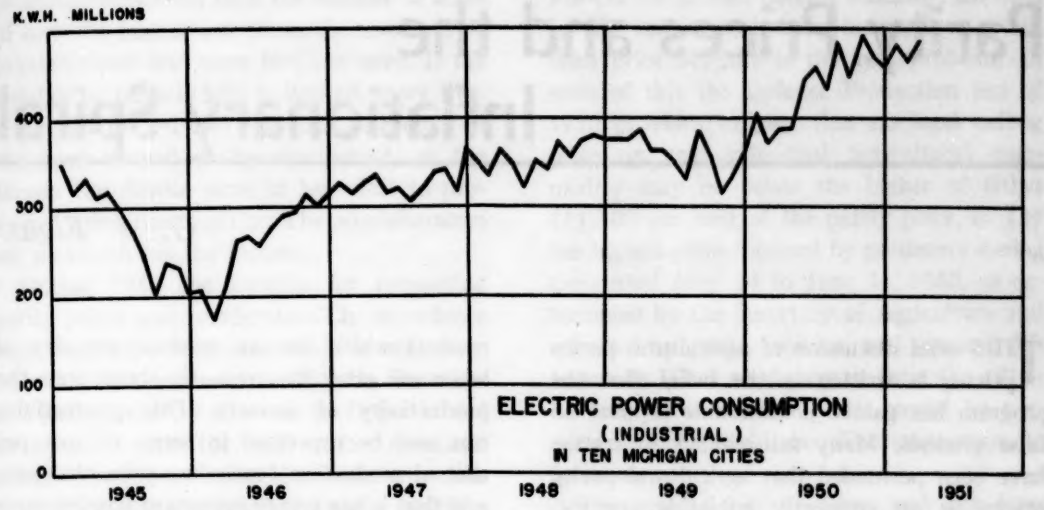
# Michigan Business Indicators



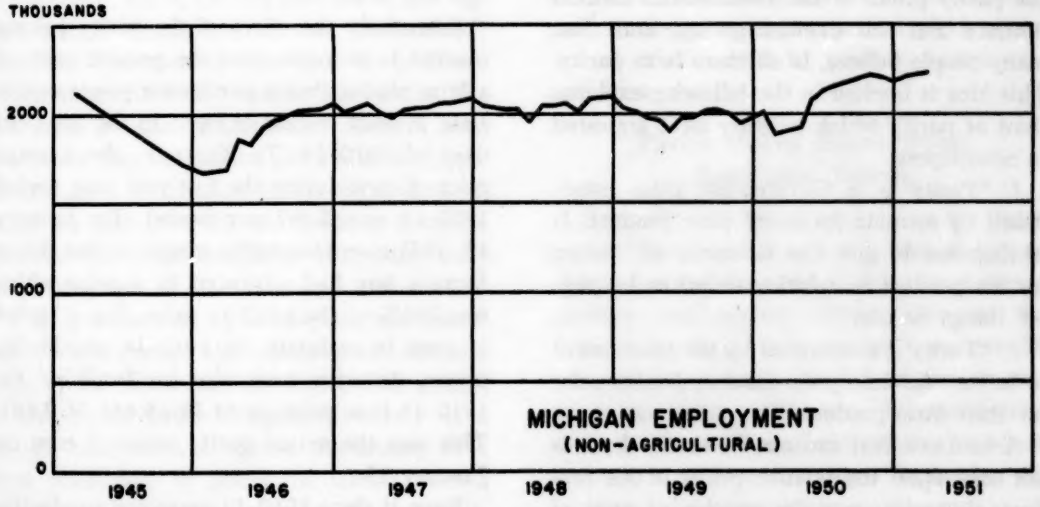

***BANK DEBITS—THE MOST INCLUSIVE MEASURE OF BUSINESS ACTIVITY***—**Following the strong recovery of 1950 bank debits in the Lower Peninsula continue their sidewise movement. Their future movement will be largely affected by the price level.**




***UPPER PENINSULA BANK DEBITS***—**The pattern of Upper Peninsula bank debits resembles debits below the Straits except for somewhat greater stability.**




***POWER CONSUMPTION***—**Power consumption is crowding close to capacity and can increase only slowly from the present level.**




***EMPLOYMENT***—**The chance of a reconversion decline in employment diminishes and if it occurs should be of short duration.**

*An analysis of the development and nature of parity pricing, its impact on production and consumption, and its relationship to the current inflation.*

# Parity Prices and the Inflationary Spiral

*G. A. Elgass*

THIS brief discussion of agricultural parity pricing is written in the belief that the program has gained considerable support on false grounds. Many fair-minded Americans have been persuaded that agricultural parity pricing is an eminently equitable concept. They believe that since a parity price will maintain a constant ratio between the prices received by farmers for their products and the prices paid for what they buy, farmers are merely aided in maintaining their relative purchasing power (or real income). If the prices paid for things farmers buy go up, then the parity prices of the commodities farmers produce and sell likewise go up, and that, many people believe, is all there is to parity. This idea is implied in the following explanations of parity which recently have appeared in newspapers:

1. "Parity is a Government price established by formula for every farm product. It is supposed to give the farmer a fair return for his product in relation to prices he pays for things he uses."

2. "Parity is a figure set by the government to be sure farmers get a decently livable price for their farm products."

A farmer's real income, however, depends not only upon the relative prices of his products, but also upon the *number of units* of product which he can produce per day of labor and other resources—in short, upon the productivity of farmers. This productivity can also be expressed in terms of cost per unit of production (excluding price changes), and thus it has a very important bearing upon real income, for if a unit of farm product has the same purchasing power but costs less to produce, the farmer's real income is increased. Yet changes in productivity are not allowed for in the parity price concept.

*About the author –*
Mr. Elgass is Instructor in Marketing in this School.

## What Parity Pricing Really Means

Essentially the effect of the parity pricing concept is to insure that the present price of a farm product has a purchasing power equivalent at least to that enjoyed in the good old days of 1910–14. To illustrate, the average price of corn during the five-year base period 1910–14 was $.642 per bushel. By January 15, 1951 a representative sample of the things farmers buy had advanced to a price which was 266% of the 1910–14 price. For a bushel of corn to maintain its 1910–14 purchasing power, its price must also be 266% of the 1910–14 base price, or $1.71 ($.642 × 2.66). This was the actual parity price of corn on January 15.

Even if since 1910–14 increased productivity has enabled the farmer to produce three times as many bushels of corn with a day of labor and other resources, the parity price is

still $1.71 per bushel and if paid would indicate a trebling of his real income. This is a rather nice arrangement to have—if you happen to be a farmer. Moreover, if the government administrators limit the number of acres of corn the farmer can plant, the rows can be planted closer and more fertilizer used. If the number of bushels sold is limited, more livestock can be fed and the corn marketed on the hoof instead of by the bushel, or the farmer can devote more of his effort to producing other commodities. The administrators are no match for the farmers.

During 1950 the formula for computing parity prices was "modernized" in accordance with legislative amendments. It is still true, however, that on January 15, 1951 the effective parity price for corn was $1.71 per bushel as computed under the "old" method described above. The reason is that for basic commodities[1] parity must be computed under both the "old" and the "modernized" formulas, and until 1954 the higher will prevail. For non-basic commodities, parity in 1951 cannot be more than 10 per cent below that computed under the "old" method—there is no upward limit. At present, parity under the "old" formula is higher for all basic commodities except rice. Thus, the old formula is still significant. A description of the "modernized" method of computing a parity price is offered in an appendix to this article. Essentially, like its ancestor, the "modernized" formula aims to insure that the present price of a farm product has a purchasing power equivalent at least to that of 1910–14. It does, however, provide for some flexibility of specific commodity prices.

The government, of course, has not undertaken to maintain this parity price relationship to the fullest possible degree. But neither is the parity price being used merely as a rough benchmark to guide the setting of a true price floor to shield the farmer from a collapse of the price structure. Present legislation requires that authoritative measures be taken to support the prices of basic commodities at 90 per cent of the parity price.

But with inflationary forces vigorously at work in our present defense economy, the need for the restraint of rising farm prices rather than price support is the real problem. In spite of this the Defense Production Act of 1950 provides in part that no legal ceiling price on any individual agricultural commodity may be *below* the higher of either (1) 100 per cent of the parity price, or (2) the highest price received by producers during the period May 24 to June 24, 1950, as determined by the Secretary of Agriculture and adjusted by grade, location, and seasonal differentials. Thus no departure from the 1910–14 pattern of relative prices would be permitted if it would be disadvantageous to farmers.

The relationship of farm and non-farm prices in the period 1910–14 was generally favorable to farmers and it is understandable why some feel that they should strive to maintain it. Yet the continuation of such a historical relationship is surely unfavorable to the economy as a whole. Certainly many of us still believe that as underlying forces change in our economy the prices of individual goods and services should change and yield a new set of relationships to guide our economic activities.

## Parity Prices Resist Basic Economic Forces

After World War I most farmers faced grave difficulties. They were burdened with an almost fantastic amount of debt, large export markets were suddenly disappearing, and the demand for many farm products was not increasing in proportion to the advance in productivity. There were severe downward pressures on farm prices. Later when the whole economy went into the Great Depression the problems of farmers became still worse.

Today, although there would be considerable variation among individuals, most farmers are in a much more favorable position. It

[1] The Agricultural Adjustment Act designates the following as basic commodities: cotton, wheat, rice, corn, peanuts, and tobacco.

is not the purpose of this article, however, to contend that today there is no farm problem —especially is there a need for inducing a large number of new members of our growing labor force to move away from some farming areas. Nor will the following analysis constitute an argument against some kind of price floor.

It is the opinion of the writer, nevertheless, that a better approach to improving the economic well-being of farmers is to maintain a *generally* healthy, progressing economy. This would provide new employment opportunities to which workers could shift. It would also do much to avoid a need for price floors. The present approach of parity pricing, using an ancient set of price relationships as a guide, works against required employment shifts and other changes by resisting basic forces such as changes in consumer tastes and increases in productivity.

Only by accident will a price computed by a parity formula avoid conflict with such basic forces. Consequently, the parity concept does not provide a sound measure of relative prices. Prices determined in that way can be either too high or too low. By resisting necessary changes the parity concept tends to distort production and income relationships. Moreover, when consideration is given to some very real differences among farmers, parity pricing appears to be neither economically sound nor equitable even as among farmers.

The concept in practice has not been as bad as it might have been precisely because it has not been completely followed. The unsoundness of the concept might be much more serious, however, in a defense economy in which this guide was more rigidly used to determine price relationships. The reasoning behind these statements can be illustrated by considering the effects of parity pricing in respect to changes in productivity. It is useful to distinguish three different productivity situations.

### The First Case

The first case is one in which cost per unit of production (excluding price changes) for a farm commodity decreases at a rate just sufficient to keep in step with advancing productivity for the whole economy. Since parity would maintain the purchasing power of a unit of product, a farmer could increase his real income by producing more units of product with the same labor and other resources, or he could have the same real income with less work and more leisure, or he could take some combination of increased income and leisure. He would merely be moving ahead with the whole economy, however, and not changing his relative income position. In this special situation the change in productivity would not tend to make the parity price differ from the free market price. Product demand would also influence the market price, but if the market wanted to continue with the same proportion of resources devoted to producing this commodity, demand would not tend to change the price. The parity price and the free market price would be the same under these very special circumstances. The effects of a change in demand conditions are considered in the next case.

### The Second Case

The second case is that in which the cost per unit of production of a particular farm commodity is not reduced, or in which the rate of cost reduction is below average, in a progressive economy. In this situation the parity price would be too low to keep the income of its producers advancing in step with the income for the economy as a whole. In the absence of sufficient downward pressure on price for the demand side of the market or an attempt to maintain the parity price as a ceiling, market forces would raise the price above the parity level.

Perhaps the operation of such market forces may be simply illustrated in terms of what we could call the price of lawn mowing. Let us conveniently imagine first a small lawn which could have been mowed in about one hour in the base period 1910–14 at a price of 20¢, and second, that there has been no increase in productivity for this job. If one

were to apply the parity price concept here, what would be the parity price today? The parity price would be 53¢ ($.20 × 2.66), and this would give the worker about the same real wage or purchasing power for this job as did 20¢ in the base period. Since there has been no increase in productivity it would not be possible to cut more lawns per day of work. Thus a day of work devoted to lawn-mowing would yield no higher real wage than in the base period.

If home owners really want someone to do the job, however, what must actually happen to the price of lawn mowing? The price must go up to provide an increase in real wages in line with the increase for the economy. It must go above the parity price or workers will shift to different, higher paying jobs.

Thus it seems clear that a parity price can be a poor measure of price relationships by being too low. Moreover, this not only *can* happen—the facts indicate that it *does* happen. Wool, cotton, beef cattle, lambs, and veal cattle are examples of important commodities for which the market prices are now above parity levels. Cotton excepted, it is likely that unit production costs for these commodities have decreased at a rate below the average for the economy and tend to raise their prices. However, the behavior of market demand for these commodities also plays a very significant role in raising their prices. Although some of the present upward pressure on the prices of these commodities is purely the result of inflation, part of it is due to relatively strong market demand.

On the other hand, demand exerts a downward pressure on price for many other agricultural commodities. As the general level of productivity and income for the economy is raised there is a less than proportionate increase in demand for some products. This is especially true for some food items. In effect, higher productivity enables us to produce all the food consumers demand with a smaller proportion of our resources. The market then calls for a diversion of resources to other lines of production. This is normal and desirable in a progressive economy. At the same time, however, this need for a shifting of resources may cause the prices of even those commodities with below average rates of unit cost reduction to be forced below parity levels—until the shift is accomplished.

### The Third Case

The most striking effect of parity pricing occurs in the third situation in which the reduction of cost per unit of production for a commodity *exceeds* the increase in productivity for the economy as a whole. In the absence of an unusual increase in demand, the market price of the product would normally decline and consumers as well as farmers would benefit from this large reduction in unit cost. The parity concept, however, does not permit this. The parity price would not decline. At the parity price farmers producing the commodity in question would be able to keep all the gains of increased productivity, and they would gain a greater advance in real income or leisure than would other producers.

It would be a satisfying experience if we could analyze the change in the real income of farmers over a period of time and determine just what effect parity pricing has had upon the income of farmers. This does not seem feasible, however, because of several complicating factors. One serious complication is found in the parity pricing policy itself. The government has not intended to maintain prices at 100 per cent of parity; it has attempted to support various commodities at different percentages of parity; these percentages have varied from time to time; and the government's attempts have met with various degrees of success. Another complicating factor is that the increase in productivity which has taken place in agriculture varies markedly by commodity, type of farm, size of farm, region, etc. Farmers and farms are not all alike, and a sharper recognition of this and the ways in which such differences condition the effects of parity pricing perhaps would be more useful than a measure, which such differences help to obscure, of the dollar effect of parity pricing upon farm incomes.

## Farm Costs

A brief look at what has actually been happening to unit costs of production in farming may support this statement. The most recent study on farm costs and returns published by the U. S. Department of Agriculture indicates, for example, that relative to the prewar period 1937–41 cost per unit of production is still at about the same level on family operated dairy farms in central New York and southern Wisconsin.[1] But over this same relatively short span of time cost per unit of production is down to about one-half the old level on family operated winter wheat farms. The report covers seven major farming regions and the two extremes in respect to the change in unit cost have been cited. It is also likely that unit costs cannot be measured and corrected for changes in the price level with complete accuracy, but what is important here is that there are wide differences in the degree of cost reduction. It then seems quite clear that, especially working from a 1937–41 base, parity pricing would have markedly different effects upon incomes in the two regions. Net real income on the wheat farms has in fact gone up much more than net real income on the dairy farms included in this government study.

These few facts are indicative of the true distinctiveness of the individuals whom we too often lump together as "farmers." While there is a real usefulness to such broad classification, it is also necessary to remember that the particular production and marketing problems faced by individual farmers are extremely varied. The parity price concept does not adequately allow for this diversity. It therefore cannot be a sound measure of price relationships even as among the many different farm commodities.

Moreover, when the parity pricing concept acts to prevent consumers from benefiting from the rapid cost reduction which occurs in some more favored lines, it can hardly be hailed as equitable. Fortunately, such a situation is strikingly unusual in our economy. We do not find that the owners of capital keep all of the increased output of goods produced with their capital. Nor do we observe that producers of manufactured goods are able to keep all the gains when greater productivity lowers production costs. Normally, increased productivity sets in operation market forces which act to reduce price or improve product quality and thus, regardless of their origin, make the gains of productivity generally available. But in agriculture the law does not allow changes in productivity or other basic economic forces fully to express themselves through price changes. Authoritative measures such as government buying, government credit, acreage restrictions, marketing quotas, etc., are used to maintain the parity relationship of prices and rigidly resist such basic forces. Certainly there would be vigorous opposition if any group tried to make the prices of such goods as electric light bulbs, radios, automobiles, rayon, etc., conform to some ancient pattern which would block the general distribution of the gains of higher productivity.

## Parity Pricing and the Consumer

In a competitive economy the benefits of increased productivity will be largely passed on to the whole body of consumers even if the producers can claim full credit for improvement. Not even this claim can be made for the advanced productivity of agriculture. In fact much of the increase in productivity is due not to farmers but to city people—the producers of farm machinery and equipment, the producers of chemical fertilizers and insecticides, and scientists who have worked out better methods of production and developed superior seed and animal stock. An appeal for fair treatment hardly supports the argument that farmers should have the power to keep all the gains of higher productivity.

[1] "Farm Costs and Returns, 1949, With Comparisons, Commercial Family-Operated Farms in 7 Major Farming Regions," U. S. Department of Agriculture, May 1950.

## Parity Prices and Inflation

There are of course other important forces which would have a bearing on agricultural prices and output, but enough has been said to indicate the basic unsoundness of the parity price concept. It should be emphasized, however, that the uneconomic effects of this concept are especially dangerous during this period of national emergency. When the law provides that prices be supported at 90 per cent of parity at least some departure from the historical price pattern is allowed, but in the present environment of general price ceilings there is still less opportunity to depart from the outmoded price pattern since the law will not allow ceilings on farm prices to be lower than 100 per cent of parity. The preceding analysis of parity indicated that an economically sound price may be either above or below a price computed by the parity formula. By authoritatively forcing prices closer to the parity pattern this 100 per cent of parity requirement will yield a pattern of price relationships which is more unsound than that which already exists. It also adds to the array of dangerous inflationary forces. Neither of these effects enhances our national strength.

Unless spending is reduced enough to definitely stop further inflation, farm prices will continue to rise. Of course, if price ceilings restrain advances of the prices of things farmers buy, farm prices will finally hit full parity levels and may be placed under ceilings. But this is easier said than done, for during the time farm prices advance towards 100 per cent of parity, upward pressures will be placed upon the prices of goods and services making use of the farm commodities. Price adjustments made here and there will raise the cost of living and result in new demands for wage advances. The first thing we know, the prices of the things farmers buy will be higher, existing ceilings on farm prices will then be below the revised and higher parity prices, and around the spiral prices may climb again. The parity price formula obviously is as unsatisfactory for determining ceiling prices as it is for determining support prices.

It was pointed out before that this is not an argument against some kind of price floor. The use of some type of selected price supports may be called for in the face of a present or impending emergency. But such supports should be looked upon as special treatment for pathological conditions—not as a normal way of life. We should recognize that in a successful free enterprise system the free forces of the market must be allowed to operate most of the time and over most of the economy. A continuous regulation by government formula of the prices of such an important group of products as farm commodities constitutes a far greater concession than we can afford to make if we desire the beneficial results of a free system.

## APPENDIX

### *"Modernized" Parity Price Formula*

The "Modernized" parity price formula employs an Index of Prices Paid[1] by Farmers as well as an Index of Prices Received by Farmers; both indexes are related to a 1910–14 base; neither index is a current innovation.

The base price of the commodity for which a parity price is to be computed, however, has been changed. The new base price, called the "adjusted base price," is obtained by taking the following steps:

1. Determine the average of the prices received for the commodity over the last ten-year period.
2. Determine the average of the index of the general level of Prices Received by Farmers (1910–14 = 100) over the last ten-year period.
3. Then (1) ÷ (2) = "Adjusted Base Price" of the commodity.

To illustrate, the January, 1951 "adjusted base price" for eggs is computed as follows:

1. Average price of eggs 1941–50 = 38.4¢ per dozen.
2. Average Index of Prices Received by Farmers 1941–1950 = 218 per cent.
3. 38.4 ÷ 2.18 = 17.6¢ per dozen.

The *parity price* of a commodity is obtained simply by multiplying the "adjusted

[1] The Index of Prices Paid includes: producer goods, consumer goods, interest, taxes, and wage rates.

base price" by the Index of Prices Paid by Farmers (1910–14 = 100).

The January, 1951 parity price for eggs under the new formula is derived as follows:

1. Adjusted base price = 17.6¢ per dozen.
2. January, 1951 Index of Prices Paid by Farmers = 272 per cent.
3. 17.6 × 2.72 = 47.9¢ per dozen.[2]

The "modernized" formula probably does represent something of a real improvement. The inclusion of wage rates in the Index of Prices Paid by Farmers provides a more representative list of farmer expenditures. It is a question, of course, whether the inclusion was made for this purpose or because a high wage rate factor in the index would be yet more favorable to farmers, but in the sense indicated this change can be considered an improvement.

Gearing the "adjusted base price" of a commodity to the average of its prices in the 10 preceding years is also a change for the better in that it allows for a little more flexibility (or better: less rigidity) of parity prices for individual commodities. Greater price flexibility should act to encourage a better allocation of resources in respect to the production and use of individual farm commodities. However, it is interesting to note that to achieve this flexibility, market prices must depart from parity prices—a complete adherence to parity would make this flexibility impossible.

The ten-year moving average also makes the base price a little less ancient than the 1910–14 base, but this can easily be overstressed. For if during the previous 10 years, prices have been authoritatively controlled through the parity concept to conform closely to 1910–14 relationships, then a price based upon the previous 10 year pattern will also bear some resemblance to 1910–14. Thus the "modernized" parity price formula has essentially the same effect as its ancestor, namely: to insure that the present price of a farm product has a purchasing power equivalent to at least that enjoyed in the period of 1910–14.

[2] Since this happens to be more than 10 per cent below parity under the "old" formula, it is not the effective parity price; the latter is 51.5¢ per dozen. (90 per cent of the "old" parity).

# BUSINESS BRIEFS

## LABOR FORCE

The labor force in the U. S. during 1950 averaged 64,600,000 as compared with 63,600,000 in 1949, the Census Bureau reported. At the peak of World War II, in 1944, when 11 million men were in uniform, the labor force averaged 65,900,000. The term "labor force" means anyone actually at work or available for work.

## CERTIFICATES OF NECESSITY

Certificates of necessity were issued by the Defense Production Administration between January 25 and March 7 to 231 companies for 313 projects with an estimated cost of over $1,183 million. D.P.A. said the average individual tax write-off certification was 74 per cent. This brought to over $2,683 million the total cost of projects certified as necessary and eligible for faster write-off under the Defense Production Act through March 7.

## SOCIAL SECURITY

Old age and survivors insurance benefits were paid to nearly three million individuals in the sum of $749 million during the year ended June 30, 1950, according to the annual report of the Social Security Administration.

## CENSUS OF BUSINESS

### FINAL REPORTS

Individual bulletins from the Census of Business—1948 for each State may now be purchased at Commerce Field offices at varying prices. (Write to the U.S. Department of Commerce Field Service for a complete list.) A few releases that should be popular with businessmen in this area are:

| | Ohio | Michigan | Pennsylvania | Indiana |
|---|---|---|---|---|
| Wholesale Trade | $0.15 | $0.15 | $0.15 | $0.15 |
| Retail Trade | .30 | .20 | .30 | .20 |
| Service Trades | .25 | .20 | .30 | .20 |

*Break-even point analysis of small businesses shows stair-step changes in costs, and accompanying substantial differences in earnings.*

# Profit Pockets

*William M. Hoad*

SMALL businesses, particularly small manufacturing plants or shops, frequently report difficulties when expanding volume. A common experience is inability to "get over the hump." A moderately profitable operation fails to yield an income commensurate with the owners' ambition, or refuses to grow to a point that promises the security or opportunity desired for his widow or heirs. Experimental attempts to expand, sometimes quite courageous in view of limited resources, result in costs rising much more rapidly than revenues. Yet the owner can demonstrate lower costs, a better competitive position, greater resistance to cyclical adversity, and similar benefits if only he could expand to a given volume. This volume usually exceeds present output by a substantial amount. It is two or three times as much, rather than ten or twenty per cent more. And it cannot be attained gradually, at least not without incurring severe losses in the process.

Another situation, which appears superficially to be just the opposite of this, sometimes arises when a concern outgrows its existing plant. Operations have been profitable in spite of an inefficient layout and outmoded equipment. The business acquires a new, larger plant, with advantageous layout and modern machinery. Yet operating results in the new plant prove disappointing for much longer than the expected shakedown period. Even though most expansion and improvement programs turn out well, enough do not to suggest some reason other than poor judgment or bad luck.

*About the author —*

A specialist in analyzing and teaching the problems of small business, William M. Hoad is Research Associate and Lecturer in this School of Business Administration.

## Break-even Analysis

Inquiry among small manufacturers indicates that experiences like those illustrated above are not uncommon. It further suggests that the costs of small businesses may not follow the pattern of conventional break-even charts. These charts analyze the effects of changes in output on the cost of production, with costs typically divided, in more or less detail, into those classed as relatively fixed and those that vary with output.

In the long run, all costs are variable; contrariwise, for the extreme short run, all are fixed. Break-even analysis ordinarily assumes plant to be fixed, and examines the effect of various levels of output on production costs and profits. The technique may be applied to management and marketing, as well as production. Each of these three branches of business activity may have an optimum, or a series of near-optimum, relationships between expenditure and output. For a given concern, these optimums in production, management, and marketing probably will not coincide. Adjusting output to achieve greater efficiency in one field typically leads to some loss of efficiency in another. This holds for businesses of all sizes.

## Costs in Small Businesses

Costs of the small business, nevertheless, differ from those of the large in a number of

respects. In the first place, most, if not all, costs in small business are variable over reasonably short periods of time. The owner-manager, in planning for the next year, half-year, or even quarter, can seriously contemplate increasing his space, machinery and equipment, management, and marketing organization several fold. Indeed, he typically thinks in these terms. In the accompanying illustrative chart, plant space increases to about three times its lowest amount, machinery to eight, and four different marketing organizations and at least two different management (owner) assignments are involved. A huge corporation could not consider changes of such relative magnitude over short periods of time. A small operator can, simply because he is small. Expansion of productive equipment by a one-machine plant to eight times its original capacity requires the installation of only seven additional machines, which is quite feasible within even a short period.

Secondly, small business cost curves are discontinuous—that is, they move in a series of steps rather than in smooth lines. The addition of a single unit of a productive factor looms large if there were few such units to start with. Even the traditionally variable costs, such as labor, materials, and the like, often behave in this manner. Addition of one machinist may create a capacity that can be fully utilized only if output expands substantially.

This underlies a third difference between large and small concerns. Just as many fixed costs are in fact variable over short periods in the small firm, so some of the variable costs take on the character of fixed costs, in the sense that they result in excess capacity over significant ranges of output. Attempts to expand output so as to use these excess capacities often lead to expansion of some other business function, which in turn cannot be fully utilized until output again increases.

## Marketing Costs

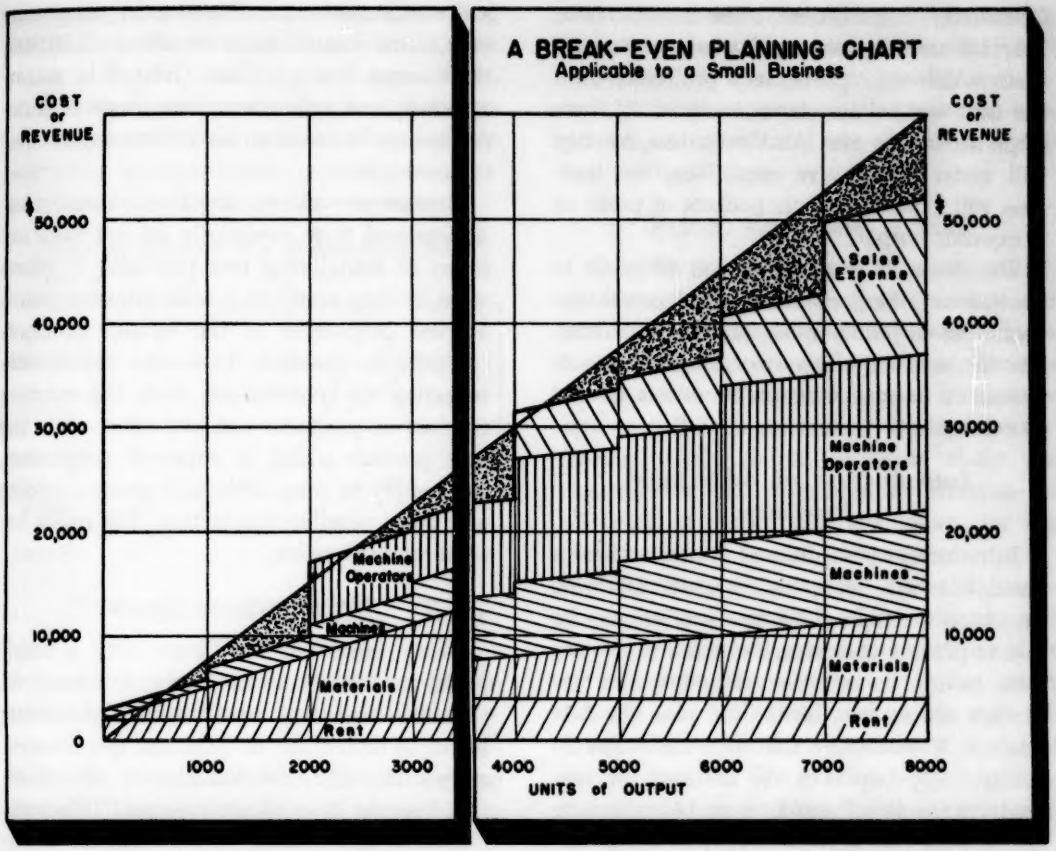
Most small businesses operate in a stage of rather sharply increasing marketing costs. Typically, personal acquaintanceship of the owner brings a certain amount of business. Mere proximity may enlarge this low-cost market. In any event, the first orders will be those that are easiest to get. Expansion beyond this point requires either more intensive market penetration or geographic extension of the market. Each entails an increase in marketing cost per unit of product, aside from possible discovery of a class of low-cost customers that had formerly been overlooked or of a different marketing technique of which management had been ignorant. In general, sales can be increased in only two ways: by reaching new customers, or by selling old customers more. Granting well-informed, intelligent marketing to start with, greater sales effort is necessary to sell more in either way.

At various stages of expansion, however, sales costs per unit may decrease for a while with increases in output. They, too, are discontinuous for the small business. In a given situation, certain expenditures may be essential to any greater sales. Once these are made, a considerably greater volume of sales may be obtainable at relatively little additional cost.

## Management Costs

Management costs likewise tend to follow a step-like progression, once management-level activities absorb all of the owner's time. They may tend to be decreasing or increasing in character, depending on whether the greater specialization possible with hired managerial assistants outweighs or fails fully to offset the watering down of incentive that follows introduction of salaried executives in an owner-operated business.

Consequently, the presumption that small concerns generally could achieve lower costs by expanding output may be erroneous. Attempts to increase production may, in fact, raise cost per unit over a considerable range of output. This follows from the discontinuous character of many costs. If each segment of costs tends to rise in stair-step fashion, coincidence of a number of costs that are on the rising phase can replace a profit with a loss.




*Notes on construction of the chart*

For the first 2,000 units the owner operates his own machines. These have an annual cost of $1,000 each, and a productive capacity of 1,000 units. One man can tend two machines. Orders up to 2,000 units a year come from the owner's acquaintances at negligible cost, but beyond this point active selling is required. The owner accordingly employs not one, but two, machinists (at $3,000 each) when he adds a third machine. This frees his time to solicit orders, and he is able to double his market, to 4,000 units, without further sales expense.

Materials are costly, $3,000 per thousand output, at the beginning. They are semi-processed. When the concern reaches the 3,500 production level, it can afford to perform this processing, at a cost of one special machine ($2,000), a skilled operator ($3,000), and an increase in rent ($2,000) necessitated by addition of the special machine. Materials costs drop to $1,000 per thousand output, a saving of $7,000 at the 3,500 production level.

The chart is broken at this point, since, in effect, the business has been substantially reorganized. Up to 3,500 output the chart reflects the most economical business organization for that volume. Beyond 3,500 it amounts to a second break-even chart hitched to the first, for an organization that cannot function efficiently below the 3,500 output level. Shifts of this magnitude are not uncommon in small shops.

At the 4,000 production level, the owner approaches the limit of his ability to sell. Accordingly, sales policies are revised, with manufacturer's agents handling the product at a 15 per cent commission. This arrangement suffices until the 7,000 level is reached. At this point, the concern takes on an experienced sales director, at $6,000 a year, to line up additional selling agents, get them to push the company's product more aggressively, furnish promotional material, and generally act as the firm's representative in seeking wider markets and greater penetration of existing markets. The 15 per cent commission continues.

The charted costs do not include any return to the proprietor, even though he contributes labor and management. Whatever he gets must come out of the excess of revenues over charted costs.

Conversely, coincidence on the horizontal or near horizontal phase results in a plateau of costs which may prove very profitable until the next vertical step is encountered. If these steps occur near the break-even line, as they will under competitive conditions, the business will experience little pockets of profit as it expands output.

The distance from one pocket of profit to another may be great in terms of percentage change in output. Because of this, small businessmen may not be aware of the more remote prospects, or may lack the resources needed to reach them.

### Introduction of Additional Products

Introduction of additional products offers a possible escape from higher costs following expansion attempts. If a new product can be sold to present customers through the existing sales set-up, its addition should reduce the average selling cost of the old plus the new product. Even though the same customers do not typically buy both the old and the new products, some advantage may be gained by selling each product to its easy-to-reach customers. If either management or plant should have excess capacity suitable for the new product, a net gain would result. Even if management and plant had to be enlarged in proportion to the increase in sales volume attributable to the added product, it might still be advantageous. This assumes that the small concern has additional capital which it would like to put to work without reducing the percentage return on total investment. In effect, it amounts to going into two, instead of one, small businesses.

Ideally, additional products should complement existing products at the production, sales, and management levels. Rarely can such a perfect combination be achieved. Many a small business has regretted the introduction of a product on the basis of its suitability from the production standpoint, without adequate consideration of incompatibility at the marketing level. That this need not be the sad case, however, is illustrated by one concern, with annual sales of about $100,000, that makes four products (related in manufacture), and sells them through three independent sales forces to six different classes of customers.

Break-even charts, in their usual two-dimensional form, ordinarily do not take account of introducing new products. Furthermore, if they apply to a multi-product plant, a fixed proportion of the various products typically is assumed. Two such charts, one reflecting the possibilities with the existing product or products and the other with the new product added in expected proportion, can readily be compared. With many products and many possible proportions, this could become quite complex.

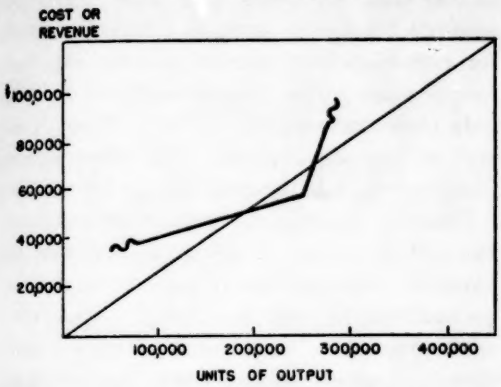
### Neighborhood Stores

Many businesses may have only a single profit pocket. It seems likely, for example, that this is true of most small neighborhood stores. They draw trade from the immediately surrounding residential area, almost entirely on the basis of convenience. This automatically limits the potential market unless the neighborhood should become more densely populated or the buying habits of the residents should change favorably. Barring such developments, the store, to get more trade, must attract new customers from outside the neighborhood, persuade a higher percentage of neighborhood residents to trade with it, or get present customers to make more of their purchases in the neighborhood.

All of these actions, however, have rather sharp limitations. Trying to pull trade from outside its own neighborhood involves giving up the appeal of convenience due to proximity. Among any group of residents, some are attracted by nearness for the purchase of some items and attempts to increase either the proportion of persons so attracted or the proportion of their purchases that they will make at a neighborhood store are likely to meet stiff sales resistance. Adding more clerks, carrying more varied or larger inventories,

supplying extra services, or raising advertising budgets are about the only means at the store owner's disposal. Each requires expenditure. Once a reasonable level for such expenditures has been determined, additional outlays do not bring commensurate increases in sales. In short, costs rise faster than revenues.

Single Profit-Pocket of a Neighborhood Store




Outside factors, to be sure, may improve the store's profit-making potential. Gasoline rationing presumably would force more purchases to be made within tolerable walking distance. Increased density of population in the area served would provide more potential customers. Building up of the community beyond the store might cause an increased volume of last-minute buying on the way home from work. Re-routing of traffic between the downtown and outlying sections of the community could have the same effect. A shift in the income status of neighborhood residents might be reflected in higher sales. However, changes of this sort are as likely to have adverse as favorable consequences. Furthermore, the store operator can do nothing about them, and break-even charts properly reflect the costs of doing more or less volume within the reasonably attainable limits. If only $80,000 of annual sales can be developed, for instance, it is futile to show how much profit would be made at some unattainable level such as $200,000.

A somewhat similar single pocket of profitable operation probably describes the independent downtown merchant's situation as well. His greater possibilities of expanding sales through intelligent expenditure may well be reflected in a longer profit-pocket, extending over a greater range of volume, or in a deeper, more profitable one than that of the neighborhood store.

## Prices, Costs, and Profits

This discussion of break-even analysis so far has turned upon the effects on costs and profits of increasing the volume of sales. Does it work the same way in reverse? Do the charts reflect what would happen in *contraction* as well as in *expansion?* A properly constructed chart should represent fairly accurately the cost-revenue-profit situation at all levels of output that are shown, for the planning period to which it pertains.

Unfortunately, many of the charts encountered in illustrations of how to make and use them carry faulty implications. They start at zero and carry an ever-expanding profit triangle clear to the end of the scale, with the implication of indefinite increase in profits as volume expands. One wonders why a businessman would concern himself with the relatively limited profit opportunity shown on the scale, and why he would waste time plotting it, when unlimited profits could be had by indefinitely increasing volume.

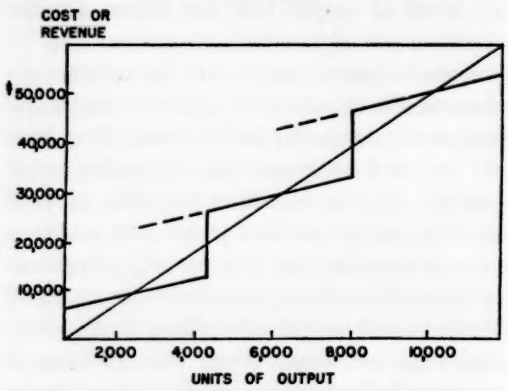
The error lies in the implicit assumption that prices remain the same regardless of output, and that costs increase only proportionately. Under competitive conditions, the revenue line would be lowered as various businessmen all sought these promised profits. Under a monopoly, this line would, in time, curve downward as additional products could be sold only through price concessions. Costs, furthermore, particularly marketing and management costs, sooner or later would increase more than proportionately. Any of these circumstances, or several in concert, would squeeze the profit triangle.

## Fixed and Variable Costs

In the long run, which by definition allows for fluidity in all factors of production, all

costs are variable at the will of producers. A break-even chart should, therefore, work as well for contraction as for expansion. This would be true, for example, of the chart for a small manufacturer that appears above. But businesses fail in the *short* run. Even with the great flexibility possible for small businesses, it would be difficult to back down quickly from one profit-pocket to a lower one without taking a serious capital loss in the process. The short-term reversal of a chart drawn to depict expansion possibilities would follow the dotted lines on the chart below. Only the

Short-Term Irreversibility of Costs
(The dotted lines represent the course of costs in attempted retrenchment without reducing fixed costs.)




variable costs, notably labor, power, and supplies, could be cut back quickly. Inventory of raw materials, semi-finished, and finished goods (or merchandise inventory in the case of a store) is considered liquid but in fact can be liquidated without loss only over a significant period of time, if at all. To be sure, a small concern can sell equipment and acquire smaller space, often within a few weeks or months. However, losses commonly accompany such liquidation, since the circumstances that induce a business to contract are likely also to undermine the market for second-hand equipment and plant. Possibly separate break-even analyses should be made for expansion and contraction over any but long periods of time. The alternative is to vary only those costs which can be contracted, as well as expanded, rapidly. This often would sacrifice reality in the case of small businesses.

Observation suggests that small concerns can and do expand so-called fixed, as well as variable, costs over short periods; and that pocket-of-profit operation typifies competitive small businesses. Some locate a pocket and stay in it; others, seeking deeper pockets, find shallower ones, or trade profits for losses; many discover increasing marketing costs to be an insuperable obstacle to graduation from the small business category. For some, apparently only a single profitable pocket exists. These remain small because they perform only a small service. This need not detract from their importance. On the contrary, the ability of a country or community to perform the small services, such as providing convenient shopping or supplying custom-built articles for minority markets, indicates a high level of prosperity and economic freedom.

## BUSINESS BRIEFS

### CERTIFICATES OF NECESSITY

Application forms for certificates of necessity for tax amortization (NSRB-140) are available at all Commerce Field offices. Copies of the list of certificates already issued (DPA-14) may also be obtained from these offices.

### PERSONAL INCOME

Personal income for the fourth quarter of 1950 (latest data available) showed a rise of $10 billion at an annual rate from the third quarter, compared with a rise of $7 billion in disposable income.

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# Productivity, Supervision, and Morale IN AN OFFICE SITUATION, part 1

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Findings on the relationship of supervision and morale to worker productivity are given in this report of a study of white collar workers and their supervisors. The study is part of a long-range research program the Survey Research Center is conducting on the factors that make for effective group functioning.

This report is based on intensive interviews with employees and supervisors in the home office of a large insurance company. Ten pairs of clerical work groups, matched in type of work and technological conditions yet differing in productivity, were included in the analysis. The interviews were designed to reveal the supervisory practices and employee attitudes associated with these productivity differences.

Results indicate that differences between high and low producing groups are related to supervision. Supervisors of higher producing groups appeared to be following a different philosophy of management than supervisors of lower producing groups. The higher producing supervisors gave more attention to motivating workers, placed less direct emphasis on production as the group goal and encouraged participation in decision making. They spent more time on supervision and less on straight production work, were not too closely supervised by their own superiors, had a greater feeling of confidence in their own supervisory roles and felt they knew where they stood with the company.

The report was written by Daniel Katz, Nathan Maccoby and Nancy C. Morse.

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# Three Recent Publications

By the [redacted]

[redacted]

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